

Abstract of the Disclosure

Provided is a focusing waveguide grating coupler using a leaky mode which can form single output beam while relieving the dependency on manufacturing processes. The focusing waveguide grating coupler of the present research includes: a substrate having a first refraction index n_1 ; a first core layer having a second refraction index n_2 , the first core layer being formed on the substrate; a second core layer having a third refraction index n_3 , the second core layer being formed on the first core layer apart from the first core layer with a space d in between; a first cladding layer having a fourth refraction index n_4 , the first cladding layer being formed on the second core layer; a second cladding layer having a fifth refraction index n_5 , the second cladding layer being formed on the first cladding layer and inserted between the first core layer and the second core layer; and a Fresnel lens positioned on the second cladding layer, wherein the refractive indexes satisfy conditions of $n_5 > (n_2, n_3) > n_1$ and $n_5 > n_4$; and light inputted through the first and second core layers to the Fresnel lens as radiated leaky beam by a leaky mode formed according to the conditions, and the leaky beam forms an optical focus by performing single directional coupling.